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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,069	10/01/2003	Martin Standing	IR-2257 (2-3684)	8099

7590 08/09/2005

OSTROLENK, FABER, GERB & SOFFEN
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New York, NY 10036-8403

EXAMINER

HA, NATHAN W

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

(2)

Office Action Summary

Application No.

10/677,069

Applicant(s)

STANDING, MARTIN

Examiner

Nathan W. Ha

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-14 and 16-27 is/are pending in the application.
- 4a) Of the above claim(s) 24-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-14, and 16-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. In view of the appeal brief filed on 5/31/05, PROSECUTION IS HEREBY REOPENED. *New grounds of rejection* are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5, 9-14, 17-19, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaffer (US 2004/0061221, newly cited) and in view of Nan De Welle (US 2004/0245519, hereinafter, Van De Walle.)

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4. In regard to claims 1 and 11, in fig. 5, Schaffer discloses a semiconductor package 54 comprising:

a first circuit board 40 including at least one conductive pad 52 disposed on a major surface thereof;

a second board 60 including at least one conductive pad 62 on a major surface thereof; and

a semiconductor die 42 including a first electrical contact on a first major surface thereof and a second electrical contact on a second major surface thereof;

a first layer of conductive adhesive 62 interposed between, and mechanically connected to, said first electrical contact and said at least one conductive pad on said first circuit board; and

a second layer of conductive adhesive interposed between, and mechanically connected to, said second electrical contact and said at least one conductive pad on said second circuit board; whereby said first electrical contact is electrically connected to said at least one conductive pad on said first circuit board and said second electrical contact is electrically connected to said at least one conductive pad on said second board.

Schaffer does not expressly label the element 60 as a circuit board. Board 64 has electrical conductive patterns built on its surface to make electrical connections to the device 30; in fact it functions as a circuit board. For example, Van De Walle discloses an analogous device including substrates 1 and 11. These substrates may function as circuit boards in order to provide higher flexibility, see section [0015].

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to realize the substrate as disclosed by Schaffer in fact functions as a circuit board and it is obvious to substitute the board as taught by Van De Walle in order to provide efficient flexibility.

In claim 2, Schaffer further comprises terminals 66, for example, electrically connected to said first electrical contact and said second electrical contact of said semiconductor die, said terminals being disposed on at least one of said substrates.

In regard to claim 3, Schaffer and Van De Walle disclose that wherein each of said circuit board is an insulated metal substrate, see Schaffer's [0023].

In regard to claim 4 and 12, wherein said semiconductor die is a switching power semiconductor device, MOSFET or IGBT which includes a control terminal, said control terminal being disposed on one of said first major surface of said die and said second major surface of said die and electrically connected to a conductive pad on one of said circuit boards, and electrically connected to a terminal disposed on one of said circuit boards, fig. 2 of Schaffer.

In regard to claims 5 and 13, Schaffer discloses that the semiconductor die is one of a MOSFET and an IGBT ([0041].)

In regard to claims 9-10 and 21-22, Schaffer further discloses a heatsink 58 disposed on the board, fig. 5.

In regard to claims 17-18, Schaffer discloses that the power devices are connected in a half-bridge configuration, see fig. 2 and section [0041].

In regard to claim 19, Schaffer discloses a control device such as Vin for controlling the operation of the devices, fig. 2.

5. Claims 7-8, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van De Walle as applied to claims 1-5, 9-14, 17-19, and 21-22 above, and further in view of Potter et al. (US 5,426,263, previously cited, hereinafter, Potter.)

In regard to claims 7 and 16, the above combination does not expressly disclose that the conductive adhesive is made of solder. It should be noted that solder material is widely used in semiconductor packaging since it is highly available and has high conductivity constant. For instance, Potter discloses an analogous package including two substrates that encapsulate a device. Potter further uses solder 18 as an adhesive device in order to provide excellent electrical connections there between.

Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention was made to adapt solder as an adhesive in order to take the advantage as mentioned above.

In regard to claims 7 and 20, Potter further discloses using epoxy underfilling between the substrate in order to encapsulate the device in a normal packaging process since epoxy is flexible and able to transfer heat.

Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention was made to use epoxy as filler as taught by Potter in order to take the advantage as mentioned above.

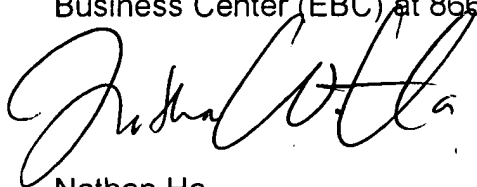
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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Nathan W. Ha', is written over the typed name and date.

Nathan Ha
August 6, 2005